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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/741,791	12/19/2003	Sang-Tae Ahn	51876P451	5595
8791	7590	10/03/2005	EXAMINER	
BLAKELY SOKOLOFF TAYLOR & ZAFMAN 12400 WILSHIRE BOULEVARD SEVENTH FLOOR LOS ANGELES, CA 90025-1030			PERT, EVAN T	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/741,791

Applicant(s)

AHN ET AL.

Examiner

Evan Pert

Art Unit

2826

AK

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>0505</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Specification***

1. The specification and claims contain informalities, some typographical in nature and some grammatically improper. A substitute specification without informalities will be required before allowance.

### ***Drawings***

2. Figs. 2A and 2B have not scanned well for a quality picture upon publishing (see faded problem in Publication US 2005/0020093 A1). These figures should be provided with better contrast for scanning or the photos should be replaced with drawings.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al. (US 6,649,503 B2):

Regarding claim 1, the Kim et al. reference discloses a method for forming a flowable dielectric layer in semiconductor device (improving on prior art forming per col. 1, line 60 to col. 2, line 54), the method comprising the steps of: a) forming a plurality of patterns on semiconductor substrate, wherein narrow and deep gaps are formed there between (Fig. 4A with gaps between gate lines just like applicant's admitted prior art); b) forming flowable dielectric layer so as fill the gaps between the patterns (e.g. SOG 210 in Fig. 5A) ; c) carrying out an annealing process for densifying the flowable dielectric layer and removing moisture therein (col. 5, lines 38-51); d) forming a plurality of contact holes by selectively etching the flowable dielectric layer to expose predetermined portions of the semiconductor substrate (Fig. 6A w/ col. 5, line 54 to col. 6 line 27); e) forming a barrier layer (250) on sidewalls the contact holes (230) for preventing micro-pores flowable dielectric layer (Fig. 7A per col. 5, line 54 to col. 6, line 27 and col. 3, lines 17-24).; f) carrying cleaning process in order remove native oxides and defects on the semiconductor substrate (col. 6, lines 40-55); and g) forming plurality of contact plugs by filling conductive material into the contact plugs (col. 6, lines 56-67).

Regarding claim 2, the step e) includes the steps of: e1) forming insulating layer over the resultant structure (col. 6, lines 28-33); and e2) carrying out dry etching so as to form spacers on the sidewalls of the contact holes (col. 6, lines 33-34).

Regarding claim 3, the step e2) is carried out by using a blanket etch process (i.e. "anisotropic etching" is known as a "blanket etch process" or "global etch process").

Regarding claim 4, the barrier layer employs a material selected from the group consisting a silicon oxide, silicon nitride and a silicon carbide (for example, silicon nitride per col. 6, lines 35-39).

Regarding claim 5, the method as recited claim 1, wherein the barrier layer is formed with thickness a range of "about 20\_ to about 300 \_" (e.g. 50 angstroms to 400 angstroms per col. 6, lines 28-30).

Regarding claim 6, after the step d), a pre-cleaning process for removing native oxides and the other impurities is carried out (col. 6, lines 44-48).

Regarding claim 7, the step of densifying (i.e. step c) is carried out in furnace at temperature a range of "about 300 \_ to about 1,000 \_" (e.g. "typically" from "about 700°C to 800°C" per col. 5, line 46).

Regarding claim 8, the Kim et al. reference discloses that flowable dielectric is "polysilazane" as an example.

***Request for Information under Rule 105***

5. Regarding claim 9, the units of temperature are missing and a search of the claim term "low temperature undoped dielectric" yields only two publications, both to the assignee of the pending application.

The examiner requests information about "a low temperature undoped dielectric," *as is claimed in claim 9*, by authority under 37 CFR 1.105.

A response under 37 CFR 1.105 is required to obtain information for examination regarding "a low temperature undoped dielectric," *as claimed in claim 9*.

The information received under Rule 105, regarding "a low temperature undoped dielectric," will be reviewed to determine if this material choice in the method of the Kim et al. reference is patentable over the SOG material choices set forth in the Kim et al. reference.

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP  
September 27, 2005

  
**EVAN PERT**  
**PRIMARY EXAMINER**